A MINERAL INVENTORY OF THE EGAN RESOURCE AREA, ELY DISTRICT, NEVADA

Prepared for:

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
ELY DISTRICT OFFICE
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Summary of Work Performed
Mineral Inventory Egan Resource Area
Contract #YA-553-CTO-78
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Work was completed on the Egan Mineral Resource Inventory in two complementary stages. First, a search of the literature was made, and data on mineral occurrences within the project area were compiled on short form Nevada CRIB forms. Courthouse records were then examined to obtain names and locations of active mining claims within the inventory area. All of the information was plotted on maps for field use. Folios were then prepared for each mining district, which included the CRIB forms, notes on mining claims, and pertinent references. This material provided the basis for planning the second stage of the inventory, the field examinations.

During the field stage of the project, every mining district within the Resource Area was visited and selected properties were examined. Important properties as well as outlying prospects were examined and described in order to provide more complete and accurate information on the occurrences beyond that provided in the literature. During the examination, emphasis was placed on collecting geologic information on the mineral occurrences and on noting current activity.

Photos were taken in each area to document activity, type of mine workings, and geologic relationships. In addition, samples showing typical mineralization were collected from most of the visited properties. All of the samples were high-graded and usually taken from dumps, ore piles, or outcrops. Some samples of nearby intrusive rock or altered material were collected for comparison purposes.

The samples were then prepared for analysis by the Nevada Mining Analytical Laboratory, UNR, Reno and analyzed for 31 elements (semi-quantitative spectrographic technique) by the Branch of Exploration Research, U. S. Geological Survey, Denver, Colorado. We would like to express our gratitude to these laboratories, for without their cooperation important information on element interrelationships within mining districts and between the various districts would not be provided.

Information collected in the field was compiled on prospect forms, and new CRIB sheets were prepared for those properties examined in the field (in some cases it was only necessary to change or add to an existing form).

The information collected during the course of the Egan project has been compiled and is presented in this report in the following form:

1) Mining District folios:
   a) Prospect forms describing each property examined in the field. Sample descriptions and analysis sheets accompany forms of sampled properties.
   b) Completed CRIB forms.
   c) CRIB forms which are incomplete due to lack of available information.
2) Photo Album, organized by mining district, containing slides of visited properties and documentation of new work.
3) Maps
   a) Planimetric maps, 30' series, for project areas, showing location of mining districts, and sample locations.

b) USGS 7 1/2' and 15' topographic maps showing sample locations and prospect names.

4) Geochemical Data

a) Sample description sheets arranged in numerical sequence.

b) Analysis sheets arranged in numerical sequence.

5) Summary report, a brief report including location, history, comments based on field observations, and some comments on geochemical results.

In addition to this information, topographic field sheets and field notes are on file at the Nevada Bureau of Mines and Geology. Also, splits of all the samples taken as well as selected hand specimens have been retained at the Nevada Bureau of Mines and Geology. This material may be useful for additional studies in selected areas.

In reporting on this project, no attempt has been made to compile detailed geologic information on the districts. Since this project was a mineral inventory, our efforts were confined to acquiring new information on prospects, and no time was available to collect new regional geologic data. Local or regional geologic interpretations were derived from published geologic maps or other pertinent literature sources. Perhaps the best summary of the geology within much of the Egan Resource Area is found in Nevada Bureau of Mines and Geology Bulletin 85, entitled Geology and Mineral Resources of White Pine County, Nevada by Hose, R. K., Blake, M. C., Jr., and Smith, R. M. (1976).

MINING DISTRICTS

EGAN RESOURCE AREA

Alligator Ridge Area

Aurum

Bald Mountain

Butte Valley Area

Chase

Cherry Creek

Currant Creek

Duck Creek

Ellison

Geyser Ranch

Granite

Hunter

Huntington Creek

Morey Peak

Nevada

Newark

Pancake

Park Range Area

Patterson Pass

Pinto

Railroad Valley Oil Fields

Robinson (Ely)

San Francisco

Silver King Well Area

Taylor

Telegraph

Ward

White Pine (Hamilton)

ALLIGATOR RIDGE

The Alligator Ridge area is located in northwestern White Pine County, about 60 miles northwest of Ely. Alligator Ridge is a north-south trending ridge which lies west of Long Valley and south of Bald Mountain in the southern Ruby Range. Although Alligator Ridge is usually included within the older Bald Mountain district which lies to the northwest, no historic mining activity is recorded for the area of the newly discovered Vantage deposits at Alligator Ridge and they rate independent consideration.

The Vantage disseminated gold deposits were discovered June 23, 1976 by a professional prospector working on a grubstake agreement with American Selco. Outcrops of jasperoid were recognized and sampled and most of the original samples ran 0.1 to 1 ppm gold. Detailed soil sampling followed by geologic mapping and drilling of 12 shallow holes confirmed the presence of a major disseminated gold discovery. The first drill hole ran 0.12 ounces gold/ton from 15 feet to 130 feet (Shule, Sutherland, 1981). Published reserves (1981) were 5 million tons of 0.12 ounces gold per ton.

The Alligator Ridge Mine, operated as a joint venture between Amselco Minerals, Inc. and Occidental Minerals Corporation, began operation in July 1981. Mining is by open pit methods. The ore is crushed and placed on leach pads for cyanide leaching. The 1981 production was projected as 589,830 tons of ore at 0.118 ounces gold per ton. There are proven reserves for a 6 year mine life and satellite reserves should extend beyond that (Amselco memo, GSN trip, 1981).

The deposit occurs in Paleozoic rocks along the eastern limb of a north-trending anticline which parallels the trend of Alligator Ridge. Disseminated gold occurs in silicified siltstone of the Mississippian Pilot Shale, with higher grade ore occurring in discontinuous carbonaceous lenses. The ore zone lies directly above a jasperoid unit which has replaced the lowest portion of the Pilot Shale, marking a transition zone between the Pilot Shale and the underlying Devonian Devils Gate Limestone.

Mineralization is apparently related to a north-northeast striking fault zone (Vantage Fault). This fault has upthrown the Devils Gate on the east against the Pilot and Joana Formations on the west. Ore is disseminated in the brecciated, silicified siltstones. Alteration consists of jasperoid (silicification) and de-calcification of carbonate rocks. Stibnite crystals have been seen in the jasperoid. Open fractures in the mineralized zone often contain jarosite, barite, goethite and quartz. Very sparse visible gold is present in quartz veinlets in oxidized portions of the ore zone. In the carbonaceous portions of the deposit, [redacted] and [redacted] are present. A sample taken from Amselco's ore pile showed anomalous [redacted] and [redacted] values.

Exposures of what may be hydrothermal breccias were seen in the east and south walls of the Vantage I pit. Kaolinite which coats drusy quartz in cavities in this breccia may be hypogene and related to the primary ore forming event.

Jasperoid is present in the overlying Joana Limestone and Tertiary volcaniclastic sedimentary rocks exposed in the Vantage I pit are altered and may contain gold mineralization.

Exploration activity (in 1981) was fairly intense along the entire extent of Alligator Ridge. The western limb of the anticline exposed at the Vantage deposits forms the eastern flank of Buck Mountain, and that area, as well as other areas both north and south along Alligator Ridge, are sites of exploration activity.

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AURUM DISTRICT

The Aurum mining district is located in the northern part of the Schell Creek Range about twenty miles southeast of the town of Cherry Creek. The district is divided into five subdistricts which are scattered between Duck Creek and Lovell Peak. Most of these subdistricts are east of the Egan Resource Area and are not described in this report. A few workings in the Schellbourne subdistrict lie within the Resource Area, however, and were examined briefly during our investigation.

According to Lincoln (1923), the Aurum district was discovered in 1871. Silver was sought in various parts of the district in the early 1870's and was explored by a number of shallow workings. Although silver is the principal commodity of the district, some production of copper, lead, zinc, manganese, and tungsten has been reported. Most of the tungsten ore was mined from the Siegel and Schellbourne subdistricts in 1954 (Smith 1976).

Several prospects southwest of Lovell Peak are within the Egan Resource Area. The prospects are underlain by Cambrian limestones and shales. Tungsten and silver-bearing replacement and vein deposits are concentrated near faults in the sediments. Granitic to andesitic dikes and stocks occur locally along faults and in the mineralized areas.

At the White Horse claim, quartz and calcite veins cut brecciated and silicified limestones of the Lincoln Peak Formation. The veins, which contain visible tungsten and copper minerals, parallel a northeast striking fault exposed in a small glory hole. Analysis of the sampled vein material showed

high silver but low tungsten values. Samples taken from other localities within the district also record silver, in addition to anomalous amounts of [redacted] and [redacted]

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BALD MOUNTAIN DISTRICT

Big and Little Bald Mountains are prominent peaks that form the southern extension of the Ruby Range in northwestern White Pine County. Early activity in the Bald Mountain district was centered around Joy, a mining camp located in the saddle between the two peaks. At this time, exploration for gold and silver took place within the Water Canyon drainage, northeast and southeast of Little Bald Mountain and on the northwest flank of Big Bald Mountain. Recent exploration is in progress on the flanks of both peaks and extends into the range east of the central district. The new Alligator Ridge gold mine is located about ten miles southeast of Bald Mountain, but is considered as a separate district in this report.

In 1869, silver lode claims were staked four miles southeast of Joy probably in the area now known as the Crown Point claims. More than 15,000 ounces of silver were produced from the district in the first year. In latter years, up through 1956, copper and gold, as well as silver, were produced from several working claims. During the 1940's, the Pioneer Mine, part of the Copper Basin Group of claims, became the largest recorded producer in the district.

The gravels in the western part of Water Canyon were explored for coarse gold nuggets in the early days and later in 1936. However, records indicate the overall production of gold from placer deposits was small.

Antimony was prospected and produced on the northwest flank of Big Bald Mountain. Minor production of tungsten is recorded from the mountain's southwest flank.

The Bald Mountain area is underlain by a normal regional sequence of quartzites, limestones, and shales which, from west to east, range from the Cambrian Dunderberg shale to the Mississippian Chainman, Pilot, Joana Formations. Several authors indicate that the sediments comprise the exposed east limb of a south-plunging anticline. Within the mined area, the principal rock type is limestone. The beds dip shallowly to the east and are intruded in the saddle area by two roughly elliptical, northwest-trending porphyritic stocks ranging from granitic to monzonitic in composition. Numerous dikes and veins related to the intrusive bodies occur throughout the area.

Several northerly high-angle and tear faults lie near or adjacent to the central mined area, along which "belts" of mineralization have formed. In addition, northwest-striking tear faults are mapped southeast of Little Bald Mountain. These faults border and are aligned parallel to the main intrusive stocks. A few thrust faults have been mapped on the west side of the peaks.

Mineralization in the district is closely related to the intrusive bodies. Copper, gold, antimony and sulfides are associated with quartz veins in the porphyry and in the surrounding country rock. Some of these veins, like those seen at the Mountain View workings, are emplaced along or cut by faults.

Contact metasomatic replacement deposits were mined adjacent to and in roof pendants above the porphyry stocks. The T G M Tungsten Mine, originally named Dees Tungsten, exposes calc-silicate rocks intruded by an irregular body of quartz monzonite porphyry. Dense, dark green, silicated wall rocks show horizons

containing clots of scheelite and molybdenite.

In the east-central part of the district, silver-copper replacement deposits occur in north-striking breccia zones along high-angle faults and in linear belts along a set of northwest-striking tear faults. Copper mineralization was noted in quartz and calcite gangue along a N60W breccia zone at the extensive workings of the Copper Basin Group. A sample collected from this working contains anomalous tin, tungsten, bismuth, and arsenic.

According to Lawerence (1963), stibnite is found in fissure fillings or in brecciated zones in limestone at the Crown Point Mine, Dees Antimony, and the Gold King Mine. Place Amax has recently conducted extensive drilling and sampling on their BF claims near Dees Antimony.

Extensive outcrops of jasperoid and jasperoid breccia occur at Bald Mountain, and widespread silicification of intrusive and carbonate rocks within the district was confirmed on our field investigation. Several claim blocks and sites of recent drilling east of the district are located in areas of exposed jasperoids associated with hydrothermal brecciation and altered intrusive dikes. A sample taken from this area shows high barium and anomalous arsenic and antimony.

Every sample collected from the district contains anomalous quantities of arsenic.

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BUTTE VALLEY AREA

Butte Valley is a typical, north-trending Basin and Range graben located in northwestern White Pine County. It is bounded on the west by the Butte Mountains and on the east by the Cherry Creek and Egan Ranges. A southern access route to the valley is provided by the Thirty-mile Road which heads north from Hwy. 80 at Robinsons Summit.

Large claim blocks held by Bear Creek Mining Company and Exxon Minerals are located on valley fill just west of the southern Cherry Creek Range (T22-23N, R60-61E). Activity on these claims has received recent attention because of the reported discovery of a large porphyry copper deposit beneath Tertiary alluvium and volcanics.

A seismic refraction survey of the prospect area was conducted by Gulf Science and Technology for Bear Creek Mining Company. The results were reported in Shuey et al., 1977, and summarized by Wright, 1981. According to Wright, the deposit is overlain by 100-1,000' of basin fill, an unaltered slide block of Paleozoic sediments, and directly by an old fanglomerate. The survey revealed that the deposit is complexly faulted. W. R. Wilson, formerly of Bear Creek Mining Company, informed us that Bear Creek drilled several deep (1,000' or more) holes in which sulfides were found. Because of the deposit's estimated depth (approximately 2,000' below the surface) and the unstable conditions of the alluvial overburden, it is currently considered unfeasible for development.

About ten miles to the north, Gulf Minerals conducted exploratory drilling for porphyry copper on their Mag claims (T24N, R61E) in 1975. They still held the claims in 1979.

No sign of drilling or any other activity was found in our reconnaissance examination of the area in July, 1981. However, we did visit and sample an inactive prospect pit in the southeastern part of the valley.

Selected References

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CHASE DISTRICT

The Chase mining district occupies a small area between Walker and Water Canyons on the west slope of the southern Ruby Mountains. The district is inside the boundaries of the Ruby National Forest about three miles south of the Elko/White Pine County line.

The district is little known and produced only a few tons of lead-silver ore in 1951 and 1954 (Smith, 1976). The ore probably came from the Bellview Mine, the largest in the district. This mine is located in a small draw which contains several other old, unnamed workings.

The southern Rubies are composed of limestones, shales and quartzites of Cambrian through Devonian Age. The sediments on the west side of the range are oldest with progressively younger rocks outcropping to the east. The section is interrupted and truncated by north, northeast-striking faults. No intrusive rocks have been mapped within or near the district (Hose and Blake, 1976, Geologic map of White Pine County).

The rocks underlying the Chase district are Cambrian limestones, siltstones, and shales. An ovoid-shaped body of Tertiary jasperoid breccia caps the sediments in the central part of the district.

A portion of this jasperoid body, south of the Bellview Mine, was visited during our field investigation. Here, quartz-veined jasperoid breccia forms the spine of a small northeast-trending ridge. Close examination of the breccia revealed that it contains highly silicified, angular fragments of limestone and siltstone. Some of the fragments are quite large, reaching up to

10" in length. The fragments display a random network of quartz veinlets which predate brecciation. Complete or partial leaching of the fragments is evident in outcrop and in the surface rubble. The breccia is cemented by massive to crystalline, vuggy quartz veins averaging 5" in width. Coarse, terminated prisms of quartz commonly fill open spaces, encase limestone fragments or occur as drusy encrustations on milled fragments. Most of the veins strike N 20 E, an orientation which may reflect the original bedding of the host rock. Except for scattered manganese oxides, no mineralization was observed.

Most of the old workings in the district are near the Bellview Mine just below the summit of a small flat-topped hill. Several short adits and cavernous cuts explore exposures of jasperoid breccia along a north-striking, east-dipping fracture zone. Outcrops of limestone near the zone display fine honeycombs of siliceous stockwork veining. Silicified breccia fragments from dumps on the west side of the hill contain pods and stringers of galena, malachite, and pyrite. Unoxidized pyrite also occurs along the selvages of quartz veins.

At the time of our examination (1982) an active precious metals exploration program was being conducted by NWX, Inc. Exploration holes up to 400' deep had been drilled throughout the entire area with extensive exploration concentrated on the flat-topped hill above the Bellview Mine.

Selected References

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CHERRY CREEK

The Cherry Creek district covers a large portion of the northern Egan and southern Cherry Creek Ranges in the north-central portion of White Pine County. The small town of Cherry Creek is located in the east-central part of the district, and is the only settlement. This district was the site of the first recorded mining activity in White Pine County. A gold-bearing quartz vein, the Gilligan vein, was discovered possibly as early as 1861 by soldiers traveling the Overland Stage Route between Fort Schellbourne and Fort Ruby. The discovery and early production came from veins at the mouth of Egan Canyon and the district became known as Gold Canyon, or Egan Canyon. Silver deposits were discovered to the north, north of Cherry Creek Canyon, in 1872 and a separate mining district was established there. Silver production soon exceeded the gold production from the Egan Canyon veins, and the two districts merged into one about 1905. Tungsten was discovered associated with silver ores at Cherry Creek in 1917, and moderate amounts of tungsten ore were produced through 1958.

Antimony occurs with scheelite and silver ores in the northern part of the district and in deposits west of Cherry Creek in the southwestern lobe of the southern Cherry Creek Range but there is no record of antimony production. Barite has recently been produced from one small open pit operation in this same area west of Cherry Creek.

To the north of the main Cherry Creek district, in Paris Ranch Canyon, an occurrence of bituminous coal has been prospected, but no production has been recorded.

Rocks exposed in the Cherry Creek district range in age from Precambrian through Triassic. According to Adair (1961), the sedimentary section is about 20,000 feet thick and is composed of interbedded phyllites, quartzites, shales, limestones and dolomites. The section has been cut by three sets of faults, intruded by two plutons and numerous dikes and has been hydrothermally altered and mineralized along some faults of all three sets. The entire assemblage has been tilted to a west-dipping homocline, partly eroded, partly covered by rhyolite tuffs and flows and displaced and tilted along Basin and Range faults.

The large quartz monzonite pluton southwest of Cherry Creek, at the mouth of Egan Canyon intrudes the Paleozoic section and has been dated at 40.3 $\pm$ .4 m.y. (Hose & others, 1976). Dikes of aplite, pegmatite, quartz latite porphyry, and diabase are found along joints in both the sedimentary and plutonic rocks. Northwest of the main Cherry Creek district, on the St. Patrick claim, a porphyritic dike follows the strike of the major northeast-trending bedding fault which cuts the range at that point.

According to Adair (1961), the ore bodies in the Cherry Creek district are veins or replacement bodies along faults, and he classified them into three general types according to mineral content:

1. Gold-bearing quartz veins, principally along the northeast-striking faults, but only where the faults cut quartzite beds of the Prospect Mountain Quartzite.
2. Quartz or quartz-calcite veins or veinlike replacement deposits containing silver, lead, copper, zinc, gold, and minor tungsten.

3. Scheelite-bearing calcite or quartz-calcite pods or veinlets commonly in lens-shaped swarms near bedding faults in brecciated carbonate rocks of Cambrian age.

Gold-bearing veins occur mainly in the southern portion of the district, in an area extending from the Bull Hill and Wide West Mines near Egan Canyon, south to the Johnny and Joana properties in that portion of the Egan Range locally known as Cocomongo Mountain. Scheelite-bearing quartz veins, with some fluorite, cut the quartz monzonite outcrop west and southwest of the town of Cherry Creek.

Gold-silver-base metal deposits occur in well defined quartz veins, in quartz-calcite veins, or in irregular veinlike replacement zones in or below silicified breccia zones along bedding faults. These deposits occur mainly along three major structures which crosscut the range north and south of Cherry Creek. These structures, the Black Metal, Exchequer, and Gilligan fault zones, are each mineralized in places along their entire length. Tungsten ores are found in or adjacent to the same veins as the gold-silver-base metal ores, but are generally located in separate bodies. Tungsten ores at the Happy Mine, located at the western end of the Exchequer fault zone, occur as scheelite in irregular lens-shaped masses of mixed calcite and quartz formed along bedding in a carbonate host rock. Calcite veinlets lace the host rock, and the quartz locally contains pods of radiating stibiconite crystals. The replacement ore at this property trends more or less north-south along bedding,

but the brecciated zone of the fault trends east-northeast. The local ore control is apparently favorable host rock at a structural intersection.

At the time of examination (summer 1981), exploration and some mining development was underway at several locations within the Cherry Creek district. Large claim blocks had recently been staked covering areas south of Paris Canyon, north of Cherry Creek, and along the western part of the district in the southern part of the Cherry Creek Range. These claim blocks cover outcrops of the Joana, Pilot, and Chainman formations, including some large outcrops of jasperoid in the southern Cherry Creek Range. The claims are held by large corporations, including Amselco and Chevron, and it is assumed the objective is exploration for disseminated gold. Samples taken from prospects in the southern Cherry Creek area showed high values of arsenic, antimony, and barium.

Within the heart of the old Cherry Creek district, Goldera Resources, Inc., and Normac Exploration, were working on the Exchequer-New Century, and Mary Ann, and Motherlode prospects. They have announced plans to start a leaching operation on silver ores from their properties. To the south, at the Joana and Johnnie mines, small scale underground work had been done within the previous years, but no work was in progress at the time of our examination.

Although the specific ore controls important within the Cheery Creek district are well known from literature description and therefore may have been completely explored, it is felt there are areas within the district with good prospecting potential remaining.

Extensions of the potential major fault zones to the northeast and southwest could be prospected, especially to the northeast where the Black Metal and Exchequer faults can be projected under alluvial cover at the edge of Steptoe Valley. Regional aeromagnetic patterns reflect the Black Metal-Exchquer faults as a major NE magnetic lineation which extends beyond the limits of the Cherry Creek Range. The magnetic contours also indicate that bedrock may be present under shallow alluvial cover some distance out from the range front. The favorable lower Cambrian units could therefore be projected to intersect with the northeast extension of the regional faults. Within the district, there may be locations where prospecting should be done along some of the northwest-striking faults. An example would be the area at the head of Silver Canyon where gold-silver mineralization occurs along a fault which extends northwest from the Black Metal fault.

Other areas worthy of prospecting include the large jasperoid masses which occur in the southern Cherry Creek Range and also south of the district in the Egan Range. These areas, some of which are large enough to be shown on the country geologic map, contain barite (one is the source of the barite recently mined and shipped from the district) and traces of antimony mineralization. These could be guides to dissemination gold occurrences. The area of tungsten-fluorite mineralization in the quartz monzonite outcrop southwest of Cherry Creek also is of considerable interest.

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CURRANT CREEK DISTRICT

The Currant Creek district encompasses the southern White Pine Range, the Horse Range, and the northernmost part of the Grant Range in northeastern Nye County. Mining in the Currant Creek district is diffused over a large area and explores a variety of mineral occurrences. Kleinhampl (in press) includes the Railroad Valley oil fields south of Currant within the district, but we discuss these deposits in a separate section of this report.

The central part of the district, located about 35 miles southwest of Ely near the White Pine/Nye County line, is bisected by Hwy 6. The small town of Currant lies in the southwest part of the district, marking the junction between Hwy 6 and Hwy 20. Dirt roads connect with the highway and lead to the mine sites. Most of the workings are situated in the low foothills bordering the major ranges. A few workings occupy steep canyons on the west flank of the southern White Pine Range.

The geology of this region was mapped by Wire (1961) and Moores and others (1968). Their studies show that the region is underlain by a thick (20,000') sequence of eastern assemblage, Paleozoic carbonate, and minor clastic rocks. This package is unconformably overlain by up to 15,000' of Eocene through Pliocene siliceous to intermediate volcanic rocks and fluviolacustrine sediments. Mesozoic rocks are absent from the section here as, during Mesozoic time, uplift, minor deformation, and erosion of the upper Paleozoic section was taking place.

Two small quartz monzonite stocks, the Railroad and Silver Springs stocks,

intrude Cambrian sediments along the southwest flank of the White Pine Range. Swarms of northeast-trending dikes radiate outward from both bodies. Biotite and hornblende from the intrusives yield an age date of about 32 m.y. (Moores et al., 1968).

Moores (1968) concludes that the major deformation in the White Pine, Horse, and Grant Range area is post-Oligocene in age. Folding, low-angle thrusting, high-angle faulting, and gravity sliding characterize th· complicated Tertiary tectonic history of the region. Different intensities and styles of deformation displayed in the major ranges indicate they were formed independently of one another.

Within the Currant Creek district there are several examples of thrusting and high-angle, normal faulting. The high-angle faults are generally north striking, and cut older, less extensive east-west structures. The major structural feature of the area is the west-striking Currant Creek fault, which crosses Hwy 6 in the southeast quarter of section 17, T 11 N, R 59 E. Small jasperoid bodies are found along the probable west extension of this fault in the vicinity of the Gold Point mine.

The commodities of the district are classified into two groups: metallics and non-metallics. The metallic group includes gold, silver, lead, copper, tungsten, and uranium. The non-metallic group includes fluorite, magnesite, zeolite, dimension stone, limestone, clay, and phosphate. (For a list of the major mines and their commodities refer to Table 1.)

The district is best known for its magnesite deposits. These deposits have been described in detail by several authors (refer to selected reference list). Exploration and mining of the small but high-grade magnesite deposits occurred intermittently from 1940 through 1964. The Ala-Mar and Windous deposits were the only significant producers. Only one of the deposits, the Rigsby claims, was actually visited during our field examination of the district. All of the magnesite claims, including the Rigsby, appear to have been inactive for some time.

Uranium and zeolite occurrences were prospected in the 1950's and 1960's, although no production is recorded for either commodity. Several workings southeast of Currant in the southern part of the district explore deposits of these types which are hosted by Tertiary volcanic rocks. Not far from these deposits, ornamental building stone is quarried at the El Padre mine from water lain tuffs of the Mio-Pliocene Horse Camp formation. None of these workings showed signs of recent activity and no activity was observed in the surrounding areas.

The earliest recorded production from the district is for gold and lead, mined from unknown localities in 1914 and 1916. The Gold Point mine , the best developed gold mine in the district, may have been worked in the thirties, but its only recorded production is for 590 tons of ore in 1940. Very small amounts of silver and gold-bearing ore were produced in 1949 and 1951, but the source of this ore is not known. Confusion also exists over the source of a small amount

of tungsten produced in 1954 and 1964. It is likely that it was derived the Silver Springs workings in the White Pine Range.

The Gold Point mine is located one-half mile north of Hwy 6 in the c part of the district. The mine area is developed by a northern and south group of workings, presently named the Gold Crown and Blue Jay claims, re tively. Each group consists of several west-trending adits. The main ac the property is located in the northern group and estends for a distance 496' (Wire, 1961). The present owners have held the property since 1961

The host rock for the Gold Point deposit is a quartz cemented jaspe breccia which replaces Mississippian Joana limestones. Siliceous replac of the unit occurs along bedding, but the main mineralization appears to a north-striking, high-angle zone of fracturing and faulting marked by ab gouge and surface coatings of limonite and hematite. The breccia air thoroughly silicified, angular limestone and siltstone fragments. Vuggy, white to vitreous grey, radiating quartz crystals cement the fragments. cite occurs in small quantities as vug fillings, veinlets and masses of ' spar." Small flecks of gold were observed in several breccia samples and outcrop at the southern workings. The gold occurs in the late stage, gre quartz which later infilled and cemented the breccia. Arsenopyrite and m nese are reportedly associated with the gold mineralization. Several sta quartz veining and hydrothermal brecciation are recorded in the outcrops this mine.

The intrusive stocks and dikes on the southwest flank of the White Pine Range have produced weakly mineralized, contact metasomatic (skarn) deposits near their margins. The White Pine prospects at the head of Broom Canyon explore fluorite-bearing, calc-silicate rocks composed of vesuvianite, calcite, diopside, quartz, and minor pyrite. Fluorite occurs in varying quantities in the metamorphosed rock and associated with minor tungsten mineralization. Quartz veins emplaced along northeast-striking fractures crosscut the bedding preserved in the silicated host rock. These veins contain some galena and pyrite. We observed no activity within the canyon, but the entire alluvial slope west of the canyon was staked by Amselco during June, 1981.

The Silver Springs prospect is located about three miles south of Broom Canyon and consists of three adits in the contact zone between the Silver Springs stock and adjacent limestones. The compositionally banded calc-silicate rocks contain minor pyrite and scattered crystals of low-molybdenum scheelite.

A few unnamed workings (sample localities 834-836) are located in the northern part of the district within the southwest quarter of section 32, T 13 N, R 61 E. Three shallow prospects explore northeast-striking shear zones in altered rhyo-dacitic volcanic rocks. Near the workings, an outcrop of water lain tuffs displays effects of hydrothermal brecciation. Ridges of jasperoid and jasperoid breccia cap the hill south of the workings and continue to outcrop to the south and east. The jasperoid replaces limestones of the Devonian Guilmette formation. A sample of sulfide-bearing jasperoid (sample 836) collected

in a drainage south of the prospects shows anomalous values of arsenic and antimony. No activity was noted in the area at the time of our examination, although since then the area has been staked.

TABLE 1

CURRANT CREEK DISTRICT

Mine Name	Major Commodity	Location
Ala-Mar	Magnesite	T12N,R59-61E
Chester	Magnesite	T12N,R59-61E
Rex-Pine	Magnesite	T12N,R59-61E
Rigsby	Magnesite	T12N,R59-61E
Snowball	Magnesite	T12N,R59-61E
White Knolls	Magnesite	T12N,R59-61E
Windous	Magnesite	T12N,R59-61E
El Padre Mine	Building stone	S23,T10N,R58E
Gold Point Mine	Gold, silver	S8&17,T11N,R59E
Silver Springs Prospect	Tungsten, gold?	S5,T11N,R88E
Stone Cabin Zeolite	Zeolite minerals	Within T9N,R59E
Thor U Prospect	Uranium	S9,T10N,R58E
White Pine Prospect	Fluorite, lead	S21?,T12N,R58E

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DUCK CREEK DISTRICT

The Duck Creek district is located within the Duck Creek Range, a narrow, northeast-trending ridge lying east of the portion of Hwy 93 which connects Ely with McGill. The ridge extends from Gallagher Gap, in the north, to Mosier Canyon, in the south, where it adjoins the Schell Creek Range near the head waters of Duck Creek. The ranges are separated by the spring-fed lowlands of the Duck Creek Valley.

Most of the workings in the district are located in canyons incised on the steep west flank of the Duck Creek Range. A few workings, including the Brennen, Providence, and Success mines, are located on the west slope of the Schell Creek Range near the southern end of the Duck Creek Valley.

Although the district was prospected as early as 1870, the first record of production was not made until 1904-1905 for ore from the Success mine, the most productive mine in the district. Since that time, small but steady production from several intermittently worked mines continued up to 1960. In total, 5,072 tons of ore were produced from the district and processed for lead, zinc, copper, silver, and gold. The principal ore mineral mined was galena, accompanied by lesser amounts of cerussite and anglesite.

Additional activity in the district included the mining of placer deposits east of McGill, fire clay deposits in Mosier Canyon, and high-calcium limestones at the still active Limekiln Quarry.

A fairly complete sequence of Precambrian through lower Permian limestones, shale and quartzites is represented in the Duck Creek Range. The structure is

complicated by steep normal faults and north to northeast-striking thrust faults. Tertiary volcanics overlie Cambrian rocks on the east flank of the range. A few altered, porphyry dikes occur locally.

Many of the deposits in the district are oxidized lead-copper replacement bodies which follow northeast-striking, high-angle faults in limestones and quartzites. Some replaced horizons, characterized by abundant hematitic gossan, occur along bedding and bedding plane faults in limestone. In addition, there are occurrences of brecciated quartz veins with gossans containing galena, and malachite.

At the Lead King prospects, brecciated quartz veins one-half to one inch wide occupy a replaced shear zone in limestone. The zone is three to five feet wide and marked by abundant iron oxides. The surrounding limestones are discolored, recrystallized, and randomly veined by silica and calcite. The quartz veins are cut by siliceous hematitic veinlets and contain pods of galena, pyrite, and gossan. An argillitized porphyritic dike is exposed near the mouth of the canyon. The ridge north of the canyon was recently flagged, trenched, and sampled in the vicinity of several old shafts.

The canyons one and one-half miles north of the Lead King property have been the site of drilling activity within the last five years. Five drill holes were seen at both the Keno #3 and Steptoe drill road properties. At the Ely Gibraltar mine, preparation for drilling was to begin shortly after our visit. We observed no activity other than limited staking along the west flank of the range.

The Success and Brennen mines mines, located in the southeastern portion of the district, explore gossany, northeast-striking replaced zones in limestone. At the Brennen mine, finely crystalline pods and lenses of galena replace limestone and limestone breccia along a clearly defined, east-dipping fault. Seven miles to the south, the iron-stained ore body at the Success mine is exposed at the surface of its extensive underground workings. At this mine, lead, silver, and gold were produced from an oxidized horizon which parallels the limestone host bedding. Mineralization in this horizon was probably enriched along a prominent set of northeast-striking fissures. Gangue barite is recorded from this locality (Hill, 1916), but was not observed. No recent activity was observed at either of these mines.

Samples collected from the district which were high in lead and zinc also contain some silver. Tungsten (150 ppm) was detected in one sample (# 896).

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ELLISON DISTRICT

The Ellison mining district is located approximately seven miles east of Preston within Sawmill Canyon, a deeply incised drainage on the west flank of the southern Egan Range. The main part of the district is concentrated within a square mile area about one and a half miles east of the mouth of the canyon. This area is developed by numerous short adits and shallow prospects which cover the northern and southern slopes above the canyon floor. A few workings, including the Carbonate Patented Mine, are located along the west flank of the range just below the 9,474' summit of Sawmill Peak.

An assemblage of shallow marine carbonate rocks, typical of the eastern Great Basin, composes this part of the Egan Range. The formations exposed in Sawmill Canyon range in age from the Cambrian Whipple Cave formation to the Mississippian Chainman Shale. In general, the bedding is north-striking and dips moderately to the east. The structure of the area is complicated by many north-striking, high-angle normal faults and several low-angle faults, which are interpreted as thrusts and gravity slides.

The center of the district is intruded by several small, Tertiary aged igneous bodies. These bodies consist of a shallow(?), rhyolitic-dacitic plug, a quartz monzonite porphyry, and a brecciated pebble dike or breccia pipe unit. Their crude east-west outcrop alignment coincides with the Sawmill Canyon drainage. Based on field relationships, Playford (1962) suggests these bodies are related and combine to form a multiple intrusive body.

Mineralization in the central part of the district appears to be closely

related to the intrusive bodies. On the south side of the canyon, weakly mineralized skarn deposits lie adjacent to a ridge of poorly exposed quartz monzonite porphyry which crops out in the northwest quarter of section 18, T12N, R63E. The porphyry is cut by stockworks of dark colored siliceous veinlets. Less than one mile west of the ridge, there is doming of the sedimentary bedding and intense contact metasomatic effects are displayed in the sediments. In this area, adits on the Hendrix group of claims explore copper mineralization developed in recrystallized, bleached limestones of the lower Ordovician Pogonip Group. The main ore minerals observed were chalcocite, malachite, bornite, and chalcopyrite. Green colored, grossularite-andradite garnets are common in the skarn.

On the north side of the canyon in the vicinity of the Sawmill Canyon mine group, the setting for mineralization is more complex. Copper minerals occur in blocks(?) of limestone skarn which appear to have been "caught up" in a highly silicified and sheared breccia pipe or pebble dike body. These minerals also occur with fluorite veins along a northeast-striking fracture system and do not persist along strike. Several different types of crosscutting igneous dikes and breccias were noted in this area. Some of these dikes contain minor sulfide mineralization. The igneous breccia enclosing the limestone blocks forms resistant pinnacles near the workings. In thin section, the breccia contains sub-angular fragments of several igneous and sedimentary lithologies set in a matrix composed of pulverized rock, calcite, sheared crystals, and minor pyrite. Silicification of the breccia increases markedly toward the south near the contact with the porphyry. Samples of breccia and porphyry from the central district

showed anomalous tin and molybdenum values.

By October of 1981, U.S. Borax had drilled two exploratory holes near the porphyry-skarn contact (southeast quarter of section 7, T12N, R63E). The district had been drilled previously by Lund Mining Co., although the exact location and date of this activity is not known. The core from at least three of the Lund holes (reaching depths up to 2,000') was stored on the property at the time of examination.

The workings in the southwest part of the district explore gossany, copper-lead replacement bodies along north-striking bedding plane shears in limestones and quartzites. Intrusive dikes and jasperoid breccias outcrop near the deposits. Recent flagging and geochemical sampling of the area was evident. Samples from these workings contain high arsenic and some show anomalous molybdenum or silver values.

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GEYSER RANCH AREA

The Geyser Ranch area is located about thirty-five miles south of Ely in the Schell Creek and Fortification Ranges. The area contains mines in both Lincoln and White Pine Counties and is bordered on the west and south by the Patterson Pass mining district. The major mines in the area are located on the east flank of Mount Grafton, the highest (11,000') peak in the southern Schell Creek Range.

The Schell Creek Range near Mount Grafton is composed of lower to middle Cambrian quartzites, limestones, and shales. The entire ridgecrest area and steep west flank of the range is underlain by Prospect Mountain quartzite. The Pioche shale and Pole Canyon limestone overlie the quartzites on the east. Except where disturbed by faulting, the sediments dip 30-40° to the east.

A small amount of tungsten was produced from the Deer Trail mine in 1956. A manganese deposit occurs in the Fortification Range in Lincoln County but was probably never productive.

Tungsten mineralization in the district is localized in deep-seated, massive quartz veins that cut Prospect Mountain quartzites east of Mount Grafton. The Deer Trail mine explores a two to three foot wide, milky-white quartz vein containing huebnerite crystals up to one-half inch in length.

One and a half miles southeast of the Deer Trail deposit, adits of the Geyser Ranch mine are developed along huebnerite and fluorite-bearing quartz veins. Sericite coats fracture surfaces of some of the sheared vein material.

In addition to high tungsten content, samples from the district contain some silver and barium.

We observed no activity in the district at the time of our examination.

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GRANITE DISTRICT

The Granite or Steptoe district is located on the east slope of the northern Egan Range approximately twenty-five miles northwest of Ely. Most of the old workings in the district occupy the canyons north of the site of the old Steptoe post office.

The east flank of the Egan Range near Steptoe is complexly faulted and folded. A north-striking, west-dipping sequence of Precambrian through Pennsylvanian quartzites, limestones, siltstones, and shales is disrupted by dominant northeast-striking thrust faults and northwest to west-striking tear and high-angle faults. Some folding of the sediments along north-trending axes is evident.

In the northern part of the district, a pluton of granitic to quartz monzonitic composition intrudes the Paleozoic section. This pluton covers a surface area of about ten square miles and has been dated at 36.2 m.y. (Armstrong, 1970). North-northeast striking, porphyritic dikes and quartz veins, probably related to the pluton, occur throughout the district and, in places, intrude up through the upper plates of the thrust sheets.

Steady mining in the district between 1869 and 1960 resulted in a total production of 7,070 short tons of gold and lead-silver ore containing small amounts of copper and zinc. In 1954, a little tungsten ore was produced at the Valley View mine from faulted Cambrian limestones near the pluton. In 1965, an unsuccessful attempt was made to locate steam beneath the Monte Neva hot springs located northeast of the district.

The mines in the central part of the district are located on north to

northeast-striking, gold-bearing quartz veins which average about one-half to one inch in width and reach thicknesses of a foot or more. The veins reportedly carry free gold, although none was observed. Most of the veins are emplaced along bedding in the Prospect Mountain quartzite or between the contact of quartzites and shales. They often occupy shear zones which parallel the bedding and, as a result, are brecciated and iron stained. The quartz is typically massive, milky-white in color, and contains oxidized pyrite, and manganese oxides. In some cases, weathered porphyry dikes outcrop near the vein occurrences. At the time of our examination, Noranda was actively sampling and mapping these deposits on their NEWK claim block south of the Stinson mine.

In the northern and southern parts of the district, lead-silver replacement deposits lie along shear zones in Cambrian limestones adjacent to the pluton or porphyry dikes. The largest and best developed deposit of this type is at the Cuba mine where galena occurs in coarse, crystalline calcite veins and pods. The calcite replaces limestone above and below a northeast-striking fault zone. The zone is marked by recrystallization and fracturing of the wall rock. In addition to galena, samples of limestone breccia from the mine dump contain iron, manganese, and copper oxides and anglesite. The area surrounding the mine was recently flagged and staked by Noranda.

Analysis of sample 873 from the northern part of the district showed high lead and tin values, in addition to anomalous molybdenum.

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HUNTER DISTRICT

The Hunter mining district is located about fifteen miles north of Robinson Summit on the west slope of the northern Egan Range. It is bordered on the east by the Granite district and on the north by the Telegraph district.

The Hunter mine, the most productive in the district, was recurrently active between 1875 and 1948. The oxidized ore produced from the mine contained cerrusite, galena, anglesite, and malachite. Uranium and fluorite prospects are located on the low slopes southwest of the Hunter mine, but no production is known from either deposit.

Most of the old workings, including the Hunter mine, occur at low elevations in the central part of the district. This part of the district is underlain by middle to upper Paleozoic dolomites and limestones. The sediments dip moderately to the west and are intruded in several places by igneous dikes. Post-intrusion faulting occurs locally and, in part, appears to have controlled mineralization in and near the dikes (Hill, 1916).

The workings near the Hunter mine explore lead-silver ores in breccia fill and replaced zones along faults. The faults parallel or intersect northeast-striking, elongate bodies of altered rhyolite porphyry. Silicification and kaolinitization of the dikes is common. Near the faults, the carbonate rocks are often brecciated, silicified, and veined by calcite and quartz. Siliceous limonitic gossans occur on the dumps of every working. Some samples from the central district contain anomalous molybdenum and tin associated with high lead, zinc, copper, and arsenic values. During our investigation of this area, Noranda was

conducting preliminary exploration work on their Gin and Tonic claims.

A few workings are located in the northern and southern parts of the district. The geology of these areas is complicated by thrusting which has placed younger over older rocks (Fritz, 1968).

In the north part of the district, jasperoid bodies trending north-northeast are found in lower plate rocks composed of Mississippian Joana limestones and Chainman siltstones. Shallow shafts explore shear(?) zones next to the jasperoids. Near the Rand claims prospect, a resistant body of sheared jasperoid breccia appears to cut across the bedding of the limestone host rock. Samples of jasperoid breccia from this area contain anomalous chrome and nickel in addition to barium. One drill hole was seen northwest of the prospect and the area had been recently staked.

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HUNTINGTON CREEK DISTRICT

Early mining in the Huntington Creek district was centered around Diamond Peak, an 8,970' peak that crowns the northern Diamond Range. The district is approximately thirty-five miles north of Eureka and is bisected by the Eureka/White Pine County line. The main workings surround Diamond Peak and are reached by a rocky dirt road leading up Davis Canyon from Diamond Valley. Other workings south and east of the peak are accessible from Huntington Valley on the east side of the range.

The Diamond Range near Diamond Peak is underlain by carbonate and clastic sediments ranging from upper Mississippian through Permian in age. The sediments are folded into an asymmetrical syncline which traces a northwest-trending axis just east of Diamond Peak. A small circular exposure of Tertiary granodiorite forms the summit of the peak. The granodiorite intrudes cherty limestones and minor clastic rocks of the Pennsylvanian Ely limestone on the west limb of the syncline.

The intrusion of igneous rocks in the summit area resulted in the formation of copper-bearing replacement deposits in the limestone host rocks. Several adits and open cuts located below the peak expose skarn deposits adjacent to sill-shaped bodies of granodiorite. The intrusive rocks are relatively unaltered and show a range of compositions and textures. The skarn is mainly composed of green garnets and contains chalcopyrite, pyrite, copper, and iron oxides and minor scheelite. Marbleization of the wallrock extends for more than

ten feet beyond the "sills". At least two periods of emplacement of felsic dikes and siliceous veins were observed that post-date the igneous intrusions. Minor faulting displaces the wallrock and steeply dipping fissures show concentrations of copper and iron oxides. Skarn samples from this locality contain anomalous tin (70-200 ppm) in addition to high copper values.

A few copper prospects are located in canyons on the east side of the range. In these deposits, copper minerals occur in the Diamond Peak formation along steep fault zones. At one copper prospect (unnamed) crystalline barite veins cut silicified clastic rocks and are, in turn, cut by veinlets of secondary malachite.

Sample 833, collected from the Mulligan prospect on the east side of the range, reported a high tin value (700 ppm) and anomalous arsenic and antimony.

The only reported production from the district is from the Diamond Copper mine which yielded two tons of copper ore in 1950. Nickel is reportedly associated with the copper at the Keystone patented claim, but we were unable to locate the property.

There were no signs of recent exploration work within the district at the time of our examination.

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MOREY DISTRICT

The Morey mining district is located on the east flank of the Hot Creek Range in northeastern Nye County. The district was visited briefly during our field reconnaissance of proximate areas, but merits only brief comment in this report because of its location outside of the designated Egan Resource Area.

The district was discovered in 1865. The most productive years were between 1866-91 and 1937-47 when more than 6,000 tons of silver ore valued at about $500,000 were produced (Kleinhampl, in press). Lesser amounts of gold and lead were also produced.

The old workings consist of numerous shafts and adits on the lower west slope of Morey Canyon, a fault created drainage approximately three miles northeast of Morey Peak. In more recent years, International Minerals and Chemical Corp. and Superior Oil Co. have conducted exploratory drilling in the central and western part of the district. A few private individuals hold claims in the area as well.

The deposits at Morey are high-grade, silver-bearing, epithermal fissure veins hosted by Oligocene, rhyodacitic to quartz latitic intracaldera ash-flow tuffs of the Williams Ridge and Morey Peak formation. The veins strike east-west, are vertical or steeply south dipping, and oxidized in their upper portions.

The mineralogy of the veins is complex. The main ore mineral is andorite. It occurs in the veins along with a rare and unusual mineral assemblage which includes pyrargyrite, stephanite, sphalerite, galena, stibnite, jamesonite, owyheeite, cassiterite, pyrite, and arsenopyrite (Kleinhampl, in press). Most of the

vein material we observed on the dumps was composed of alternating bands of quartz and rhodochrosite (the primary gangue materials) containing clots and stringers of ruby silver.

One-half mile southwest of the base of Morey Canyon, a major, northwest-striking fault displaces the veins. On the northeast side of the fault, in the vicinity of the main workings, the upper oxidized portions of the veins are exposed adjacent to propyllitically altered tuffs. Southwest of the fault, the tuffs show quartz-sericite alteration.

Extensive drilling of the sericitically altered tuffs approximately one mile west of the main district was prompted by the discovery of lead, silver, and molybdenum anomalies by I.C.C. (Kleinhampl, in press). Kleinhampl also notes that disseminated sulfides and anomalous tin values are found in tuffs surrounding the main district.

In addition to the expected elements, tin is present in samples collected from the workings in the central district.

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NEVADA DISTRICT

The Nevada mining district is less than ten miles southeast of Ely in the southern Duck Creek Range. Most of the mines are situated in the western foothills flanking the range and within Tamberlaine Canyon. The district is best known for its production of manganese ore from mines east of the mouth of Tamberlaine Canyon. However, within the last decade renewed exploration and mining have focused on the areas surrounding old silver prospects north of the manganese mines.

The southern Duck Creek Range is mainly composed of even bedded, grey limestones of the Devonian Guilmette formation. Younger limestones and shales of the Pilot, Joana, and Chainman formations are exposed at the southern tip of the range. Older Devonian dolomites outcrop in the northern part of the district. Displacements within and between the Paleozoic formations occur along northeast and northwest-striking, high-angle normal and reverse faults. We observed no intrusive rocks in the area.

More than 20,000 short tons of manganese ores were produced from mines in the district between 1910-1959. There is no record of production for other metals, but prospecting of silver-lead-copper ores began in 1869 and continues to this day.

The manganese mines consist of extensive underground and surface workings located in the northeast quarter of section 10, T15N, R64E. The deposits have been described in detail by Roberts (1942). In summary, the oxidized manganese ores occur as replacement deposits in Joana limestones along faults and along

bedding planes adjacent to faults. The deposits are characterized by extensive altered areas that are silicified or contain abundant iron oxides and gossan. Calcite veins commonly cement breccias or cut the host rocks. Samples of oxidized ore near the Vietti shaft contained prismatic crystals of pyrolusite. Elements associated with the sampled manganese ore include silver, arsenic, tungsten, and molybdenum.

Recent exploration work near the Vietti and Caesar manganese mines is probably related to known occurrences of gold-silver ore in the area. Roberts (1942) and Papke (1979) also note that some fluorite is found in these deposits.

Sampling and drilling of the old workings near the head of Tamberlaine Canyon took place in June, 1981. The workings explore shear zones in silicified Joana(?) limestones. A rib of jasperoid breccia outcrops near the workings. White quartz cementing the breccia contains dispersed sulfides. A sample (710) of limestone breccia collected from the dump showed high silver (500 ppm) and moderate zinc and lead values.

The Carrie Ann pit, a small open pit silver mine located in the southeast quarter of section 28, T16N, R64E, is operated by Silver West Mining Co. and, at the time of our July, 1981 visit, had been in operation for three months. Limestone beds within the pit dip moderately to the north and are locally bleached, silicified, and iron stained. Zones of intense alteration occur along several northwest-striking, high-angle faults. These zones are marked by brecciation and calcite veining of the host rock, abundant hematite and limonite, and slight

copper mineralization. The primary ore of the deposit is argentiferous galena which replaces silicified limestone or occurs in calcite veins and pods within the altered zones. The average mined ore contains 2-3 oz. silver/ton, .02-.05 oz. gold/ton, and minor lead.

All the samples collected from the northern part of the district contain some silver. A few samples with high silver values also showed anomalous arsenic.

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NEWARK DISTRICT

The Newark district is located on the western edge of White Pine County on the east slope of the Diamond Range. The district lies just west of a paved rangefront road approximately nine miles north of Highway 50.

Most of the workings are adits which occupy the lower east slope of Newark Mountain and the steep Mining Canyon drainage at the mountain's north end. The largest mines in the district are the Bay State and Meister mines. Most of the other workings are of small extent.

Production of silver and lead from the Bay State mine began in 1867 and continued regularly throughout the district's history. Revived mining at the Bay State occurred in the early 40's when tungsten was discovered in mineable quantities. More than 3,000 short tons of WO_3 were produced after this time in addition to some silver, lead, copper, and zinc. Smith (Hose, et al., 1976) reports a total production of only 17 ounces of gold from the district through 1968.

Newark Mountain is composed of a northwest to north-dipping sequence of bedded to massive limestones and dolomites of the Devonian Nevada formation and Devils Gate limestone. The sequence is conformable and broken in a few places by northerly, high-angle faults of limited extent. One east-west thrust fault is mapped in the northern part of the district and a small lamprophyric dike is exposed on the mountain's east flank (Nolan, 1971). According to Nolan, the district lies within the Diamond Mountain antiform, an uplifted structural block which forms the core of the Diamond Range in this area.

Argentiferous galena and tetrahedrite, sphalerite, scheelite, and copper oxides occur in quartz veins and in quartz stockworked breccia zones capping the veins. The veins are emplaced along minor, northwest to wortheast-striking, steeply dipping faults which cut the dolomites of the Nevada formation. The ore also occurs in small replacement bodies and veins in the highly silicifed carbonates adjacent to the veins. Smith (Hose, et al., 1976) notes that the scheelite ore is localized in the stockworks where it occurs separately from the lead-silver minerals.

Most of the dumps in the district are composed of silicified limestone and quartz vein material. Copper oxides were observed at almost every working and, to a lesser extent, zinc oxides were observed. Some very high (2,000 ppm - 5,000 ppm) silver values associated with lead, zinc, and antimony were obtained from samples collected from the dumps. In addition, one sample shows anomalous tungsten, and two others show anomalous tin.

There was no current activity in the district at the time of our examination but some shallow trenching (assessment work) had been done within the past year or so.

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PANCAKE DISTRICT

The Pancake mining district is located in western White Pine County about twenty miles southeast of Eureka in the northernmost part of the Pancake Range. Old workings in the district consist of mines, quarries, and prospects scattered throughout the low mountainous terrain lying between Hwy 50 and Pogues Station.

Early mining in the Pancake district took place during the 1870's following the discovery of small deposits of silver and coal. No production is recorded for these commodities, but a significant amount of stone insulating material was produced during this time. In 1950, an exploratory oil hole was drilled in the southeastern part of the district, but the resultant show of "residual oil" was not enough to generate further interest or expense. Presently, exploration work continues on several disseminated precious metal prospects located in the southern half of the district.

The district is best known for a coal occurrence at the Pancake coal mine located just south of Hwy 50 near Pancake Summit. This deposit has been studied by many authors and will not be described in this report (see reference list).

The geology of the northern Pancake Range is characterized by north-trending, linear belts composed of upper Devonian through upper Mississippian limestones and shales. The belts are separated by areas underlain by Tertiary rhyolitic to andesitic flows, ash-flow tuffs and alluvium. These belts coincide with the general "synformal and antiformal" structure of the range described by Nolan (1974). Further disturbance of the sediments is attributed to a few major,

north-striking faults and more minor crosscutting, high-angle faults.

A small body of dacite, approximtely one square mile in exposed areal extent, intrudes Mississippian sediments in the central part of the district. The intrusion is dated 108 m.y. making it late Cretaceous in age (Nolan, 1974). South and east of Pogues Station, jasperoids replace some of the Paleozoic sediments. The presence of both intrusive rocks and jasperoids has drawn recent attention to this area.

During our examination of the district, we visited a few of the "sandstone prospects" plotted on the Mineral Resource Map of White Pine County (Smith, 1976). These prospects were found to explore gossans along steep, north-striking faults in limestone. The limestone is brecciated and replaced by silica forming abundant jasperoids near the workings. Lead mineralization was noted at one of the prospects. It is likely these deposits are the "first discovery" silver prospects cited by Smith (1976).

A barite occurrence at the Cue Ball group of claims is located on the east slope of the Pancake Range in section 1, T16N, R55E. Barite occurs as replacement veins in Devonian dolomite. Trenches and drill holes were noted in 1979 when the prospects were last visited.

Several large claim blocks cover disseminated precious metals prospects in the central and southern portions of the district. The claim areas are generally underlain by sediments of the Pilot, Joana, and Chainman sequence which locally contains jasperoid lenses along faults and bedding. At the time of our

examination, several companies were conducting exploration work on their claims in this area.

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PARK RANGE AREA

The Park Range is a northeast-trending volcanic ridge located in northeastern Nye County. The ridge is approximately 15 miles in length and 5 miles wide. A plateau forms the top of the ridge and attains an elevation of about 9,000 feet. Pritchards Station is located in a canyon at the southeast end of the range.

The range is almost completely underlain by rhyolitic ash-flow tuffs and dacitic to andesitic lavas of Tertiary age. The flows are inclined moderately to the southeast, cut by numerous high-angle faults and display prominent vertical jointing. The extreme northwest portion of the ridge is composed of a complexly faulted sequence of Ordovician through Permian carbonate and clastic rocks.

Accessibility to the interior of the range is limited, and time did not permit us to do more than a cursory examination of the area. A few dirt roads lead to springs located in the range's northern and eastern portions. We observed no signs of mineralization or alteration in the volcanics exposed along these roads. No prospects are shown on the topographic maps which cover the range (Park Mountain and Pritchards Station 7 1/2', pub. 1968) and to our knowledge there is no past history of mining in the area.

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PATTERSON PASS

The Patterson Pass mining district is located in northern Lincoln County about fifty miles south of Ely. The district occupies the southern Schell Creek Range north of Patterson Pass and the northern portion of Cave Valley, which borders the range on the west.

The geology of the district is similar to that described in this report for the nearby Geyser Ranch area except that north of Patterson Pass slices of the Cambrian section are repeated along a few north to northwest-striking faults. These faults are truncated(?) by a major, east-west fault traced by the Patterson Pass drainage. Slide blocks of Cambrian rocks rest on the lower portion of the range near the Cinch mine and form the low eroded hills in the northern part of Cave Valley.

Rich, oxidized silver ores were discovered in the district in 1869. Some silver was produced in the 1920's, but exact quantity and source of the ore is not known. During World War II, one thousand tons of tungsten ore were shipped from the Cinch and Pip mines located in the eastern part of the district.

The workings north of the road which crosses the range at Patterson Pass explore silver and copper-bearing quartz veins and lode deposits emplaced along generally north-striking, high-angle faults. Quartz and calcite are abundant as gangue minerals, breccia cement and as veins in the host rock, which is commonly limestone of the Pole Canyon formation. Silicification of the wall rocks is common. Pyrite and ghosts after pyrite are ubiquitous and are usually accompanied

by tetrahedrite and copper oxides.

Tungsten mineralization within the district occurs in skarns developed in carbonate rocks along faults and in quartz veins. The ridge crest workings near Schwartz Tunnel Springs explore an extensive replaced horizon in the basal limestone units of the Pioche shale. Scheelite occurs as disseminated flakes in skarn with chalcopyrite, sphalerite, and occasionally fluorite. The horizon is capped by an iron-rich gossan which can be traced from the upper Schwartz Tunnel workings southwest toward the Jerry claims. The ore zone is adjacent to a major, northwest-striking fault which offsets the Cambrian section in this part of the range. The dike at the "head of Schwartz Canyon" (Hill, 1916) was never located, but a piece of altered intrusive rock was found at the Jerry claims. Minor excavation has occurred in the area since it was last staked in 1979. Skarn samples taken from the ridgecrest workings contain anomalous beryllium, tungsten, and tin in addition to lead-zinc mineralization.

In the low hills of the Cave Valley portion of the district, lead and copper replacement deposits and quartz veins follow narrow, north-striking fractured zones in limestone beds of the basal Pioche formation. An interesting texture seen in this deposit and elsewhere in the district is the complete replacement of ovoid-shaped Girvanella algae by finely crystalline galena. Similarities between the deposits at Cave Valley and the Schell Creek Range support the idea that the sliding of Paleozoic blocks into Cave Valley took place after the main period of mineralization in the southern Schell Creek Range.

Recent activity in the district was observed at the Cinch mine (Owen Walker property) east of Patterson Pass. Union Carbide was sampling, mapping, and drilling an area approximately one-quarter mile north of the exposed thrust at the Cinch mine. We were informed by their project geologist that intrusive rocks outcrop in the area and had been penetrated by their drills 450' below the surface. There is some confusion on this point, however, as the "intrusive" rocks have also been described as "Tertiary volcanics" by Gemmill (in Tschanz and Pampeyan, p. 167).

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PINTO DISTRICT

The Pinto District lies immediately north of Hwy 50 approximately eight miles east of Pinto Summit. The western part of the district, formerly called the Silverado district, occupies the Silverado Mountain area. The eastern part covers a narrow, northeast-trending ridge called the Alhambra Hills.

According to Nolan's (1974) geologic map of the Pinto Summit quadrangle (1:62,500), the district is almost wholly underlain by Devonian limestones and dolomites. East of Rescue Canyon, however, there are limited exposures of Tertiary ashflows and minor basalts. These rocks are separated from the Paleozoic rocks by a steep normal fault that runs along the western base of Silverado Mountain.

Like the Pancake Range to the south, the area is characterized by structurally isolated synforms and antiforms composed of overlapping thrust "sheets" of Paleozoic rocks. Some of these "sheets" are warped or gently folded and truncated by high-angle faults. Although Nolan (1974) observed that most of the mining within the quadrangle was located within the antiformal blocks, in the Pinto district, mineralization occurs within both synformal and antiformal structures.

Intermittent production of silver ore, including some of high grade, is recorded from the district between 1869 and 1922. Most of the ores came from mines in Rescue Canyon. Lead and copper were associated with these ores, but, on the whole, they contained very little gold.

Mines in the Alhambra Hills explore silver and lead-bearing quartz vein and replacement deposits within the Devils Gate and Nevada formations. In all cases the dposits are oxidized and occur within and adjacent to northeast-striking, steeply dipping faults and fracture zones. Mineralization observed in the silicated dump rock consists of galena, copper oxides, pyrite, and gossan. At the High Point mine, a sample of vuggy, mineralized quartz vein showed high values of arsenic, copper, lead, zinc, and tin (1,000 ppm).

Drilling near the mines in the south end of the hills was conducted in 1979. In 1980, Mars Mining was working a small open pit(?) operation below the High Point mine and reworking some of the dumps in the area. At the time of our examination, no work was in progress, but recent trenching and sampling had been done on the High Point claims to the south.

Most of the mining activity on Silverado Mountain has been in the northern and southern portions of the mountain's west flank. In the north, the mines are located on north-striking, high-angle faults in Devils Gate limestone. Vein and replacement deposits similar to those at the Alhambra Hills occur along the faults. At the Rescue mine(?), barite cements breccia and replaces the dolomitic host rocks. Exploration work within the last five years consists of drilling, trenching, and reworking of the dumps.

At the southern workings, mineralization is more obvious. Pods of crystalline galena, pyrite, and abundant copper and iron-oxide veinlets replace dolomite along fractured, north-striking fault zones.

All samples collected from the district contain anomalous to high tin. In some cases, the samples also show anomalous amounts of silver, arsenic, copper and barium.

A heap leach operation owned by Diamond Treasure Hill, Inc., Las Vegas, is located in the small basin northeast of the Alhambra Hills. At the time of our visit (1982), the operator was actively leaching reworked ores from the Silverado Mountain area and from mines in the Newark and Eureka mining districts.

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RAILROAD VALLEY OIL FIELDS

Three producing oil fields are located in northeastern Nye County within Railroad Valley.

The following abstract summarizes the development of the Eagle and Trap Springs fields:

EAGLE SPRINGS OIL FIELDS, NYE COUNTY, NEVADA

Bortz, Louis C., Amoco Production Co., Denver, Colo., and
D. Keith Murray, Colorado Geol. Survey, Denver, Colo.
from AAPG Bull., V. 62, no. 5, May 1978, p. 881.

"Nevada joined the ranks of the oil-producing states early in 1954 with the discovery by Shell Oil Co. of Eagle Springs field in remote Railroad Valley in the east-central part of the state. The discovery well produced from fractured Oligocene volcanic rock (Garrett Ranch Group). As of December 1976, the field had produced about 3.1 million bbl of oil; current production is approximately 400 bbl/day from 11 wells. Trap Spring, Nevada's second oil field, also in Railroad Valley, was discovered 23 years later, in November 1976. Northwest Exploration 1 Trap Spring, located 6 mi. west of Eagle Springs field, was completed for an initial production of 417 bbl/day, also from Oligocene volcanic rock.

Most of the production from Eagle Springs field has been derived from

carbonate reservoir rocks in the Sheep Pass formation (Cretaceous? to Eocene) and from welded tuffs of the Garrett Ranch group (Oligocene). One well produced a small amount of oil from a Pennsylvanian(?) limestone reservoir. Sheep Pass fluvial and lacustrine beds were deposited in a local basin that extended from the Egan Range on the east to the Pancake Range on the west. The Oligocene tuffs are part of an extensive ignimbrite sequence that once covered a large area in eastern Nevada and western Utah.

The Eagle Springs field is a faulted-wedged trap. Garrett Ranch volcanic rocks and Sheep Pass carbonate rocks, which disconformably overlie Paleozoic rocks, were uplifted and truncated to a feather edge on the south during late Oligocene or early Miocene time. These reservoir rocks are sealed on the top by Miocene "valley fill" and on the bottom by impermeable Paleozoic rocks. The east-side seal is provided by the major boundary-fault system that places non-porous Paleozoic rocks against the Tertiary reservoirs. This fault system separates Railroad Valley from the Grant Range on the east. The oil reservoir is limited on the north and west by water below the approximate -2,000 ft(600m) oil/water contact. This contact conforms to the structure (or paleotopography) of the northwest-plunging nose as mapped at the base of the "valley fill".

The recent discovery of the Trap Spring field bears out the writers' 1966 prediction that "...additional significant oil accumulations will be found in eastern Nevada." Improved geophysical tools and techniques are now available to map more accurately the subsurface conditions in the region. However, precise

mapping of exploratory objectives in these Tertiary basins within the Basin-and Range Province remains a challenge."

In 1981, Northwest Exploration Company discovered a third field about ten miles south of the first two. The discovery well, Bacon Flat No. 1, produced 723,000 barrels of oil in the latter half of 1981.

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Boehcher, J. W., and Sloan, W. W., Jr., editors (1960) IAPG Guidebook to the geology of east-central Nevada, contains several pertinent articles starting on page 233.

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Newman, G. W., and Goode, H. D., editors (1979) RMAG-NGA basin and range symposium and Great Basin field conference, contains several pertinent articles starting on p. 441.

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ROBINSON DISTRICT

The porphyry copper deposits of the Robinson or Ely mining district are centered near the towns of Ely and Ruth in the Egan Range, south-central White Pine County. To date, this district is the largest metal producer in the state. Between 1908 and 1963, Consolidated Coppermines Co. and Kennecott Copper Corp. produced more than 255 million tons of ore averaging about one percent copper from these deposits.

The copper mineralization is localized in an altered monzonitic to quartz monzonitic porphyry stock of middle Cretaceous age and associated skarn deposits which, in themselves, have accounted for more than 20 percent of the total production of ore (Einaudi, 1982). The stock and its related dikes and sills are crudely aligned in an east-west direction as a result of their emplacement along a pre-intrusive thrust fault (Bauer, 1966). They intrude Devonian through Permian carbonate and clastic sediments. The principal copper minerals mined in the porphyry were chalcopyrite (hypogene) and chalcocite (supergene). Molybdenum, gold, silver, platinum, and palladium were also recovered from the ore.

The main mines at Ruth are currently inactive. However, exploration activity continues in the peripheral areas of the district.

No attempt was made to visit the main copper workings. Numerous authors have published informative reports on the deposit (see reference list). Instead, keeping with the intended scope of this project, we sampled and described some of the mineralized areas surrounding the main deposit, including a few of the

early discovery sites within and north of Lane Valley.

Irregular zones of manganese, silver-lead, zinc, and gold-silver mineralization surround the main copper producing body and form high and low-grade replacement and vein deposits in the nearby sediments. Countless prospects explore these zones over an area extending more than two miles north and south of the porphyry. These deposits are mainly hosted by middle Paleozoic carbonate rocks. They show varying effects of hydrothermal alteration and are structurally controlled by faults, fractures, or bedding planes. The limestones are commonly silicified or recrystallized, bleached and veined by calcite and quartz. Most of the deposits contain gossan and oxidized manganese and copper minerals. Tungsten and fluorite have been reported from a few of these deposits.

A gold-silver deposit of this type is located near the Chainman and Revenue shafts on the south side of Lane Valley. At the time of our examination, an open pit operation occupied a small area previously explored by old underground workings. The pit exposed limestones which have been affected by shearing and low-grade hydrothermal alteration. The altered zone contains abundant iron oxides, gossan, and calcite gouge. Oxidized pyrite occurs on fracture surfaces of some silicified fragments. A sample (955) collected from the walls of the pit was found to contain some silver (70 ppm) and anomalous amounts of arsenic, molybdenum, tungsten, and tin.

Analysis of samples taken from the area surrounding the main copper pits has exhibited expected high values in copper, lead, and zinc. Minor tin is present in some samples.

The mineralizing effects of the porphyry decreases rapidly outward from the main body, and many seemingly insignificant prospects south of the porphyry show only minor silicification and calcite and quartz veining. North of the porphyry body, on the east slope of the Egan Range, a few prospected occurrences show jaspery replacement ores containing oxidized copper and zinc minerals. At sample locality 947B-948, samples of altered siltstone breccia show significant chrome and vanadium content. Recent active sampling of the northern prospects may indicate the possibility that there are yet undiscovered precious metal deposits in the area.

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SAN FRANCISCO DISTRICT

The San Francisco mining district occupies Heusser Mountain, a football shaped extension of the Egan Range west of McGill. Prospects in the district are located on the mountain's east and southwest flanks north of Hercules Gap.

The district was organized in 1869. Early prospecting of silver-lead occurrences was apparently unsuccessful as there is no record of production. Renewed activity within the last five years includes some shallow trenching and limited exploratory drilling.

Heusser Mountain is predominantly composed of Precambrian and lower Paleozoic quartzites, siltstones, and shales. On the mountain's east flank, metamorphosed Precambrian rocks are intruded by a body of porphyritic quartz monzonite dated 33.6 m.y. (Armstrong, 1970). North and south of the instrusive the sediments are cut by high and low-angle faults.

Most of the prospects in the district explore replacement deposits and quartz veins developed in sediments surrounding the main intrusive mass. Many of the occurrences are in sheared or brecciated zones which strike northerly or westerly. Although local faulting is evident, some of the deformation may be related to the forceful intrusion of the igneous body.

During our investigation of the mountain's east flank we observed copper-lead mineralization on fracture surfaces in shear zones and as replacement or vein fillings in quartzitic host rocks. At several localities, gossan and pyrite occur in randomly oriented quartz veinlets cutting Prospect Mountain quartzites. Alteration effects here are not especially notable due to the siliceous

composition of the host rock. A few of the prospects explore porphyry dikes. These dikes contain fragments of gossan and abundant oxidized pyrite.

The best developed property in the district is the Mammoth claim. It is located one-half mile northwest of Hercules Gap and is probably the site of the first claim staking in the district. Significant amounts of copper and lead minerals fill vertical, limonitic-stained fissures in limestones beneath a major north-striking thrust fault. The fault is marked by a layer of iron-stained calcite gouge. The limestones beneath the thrust are bleached, recrystallized and, in some places, altered to tactite. The property had been drilled within the last five years, but was inactive at the time of our examination.

A sample collected from the mineralized fissures at the Mammoth claim showed high silver (5,000 ppm) and anomalous tin values in addition to significant copper, lead, and zinc.

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SILVER KING WELL (SUNNYSIDE)

The Silver King Well area, not a recognized mining district, covers the Silver King mine and other prospects east of Silver King Well, south of Sidehill Pass in the southern Schell Creek Range. The area is south of the Egan Resource Area boundary in northwestern Lincoln County about 12 miles southeast of Sunnyside.

According to Tschanz and Pampeyan (1970), the geology of the Silver King area is complex. A major north-trending fault separates low hills of Chainman shale, Scotty Wash quartzite, and Pennsylvanian limestone on the west side of the district from the high ridge of Simonson Dolomite and Guilmette formation on the east. The rocks to the west of the normal fault are thought to be a down-dropped remnant of the Silver King thrust plate (Tschanz and Pampeyan, 1970). A stock of quartz diorite about two miles long and as much as one mile wide is intruded along the north-trending fault zone.

Ore bodies at the mine are described as occurring near the contact between Guilmette limestone and a small body of quartz diorite porphyry which crops out northeast of the main stock. Ore occurs as small replacement deposits and veins, and lead-silver-arsenic sulfides are reported present.

At the Silver King mine, old workings and prospect pits explore replacement lenses in limestone along N55°W structures, and kaolinized dike rock occurs in some workings. Other nearby prospects also follow N40°W to N80°W fractures. Dumps are rich with gossan, jasperoid, and galena pods were found on several.

Most of the immediate area of the old workings, and the valley to the west, showed evidence of recent claim staking and exploration activity. At the time of examination, Anaconda Mining Company was drilling the Silver King property, and a diamond drill was located on a site just west of the old mine.

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TAYLOR DISTRICT

The Taylor district is located on the western slope of the Schell Creek Range, north of Conners Canyon, about fifteen miles southeast of Ely. The district was discovered in 1873, and some 60,000 tons of ore averaging 20 ounces silver to the ton is said to have been produced during the following 20 years. Production was mainly from two mines, the Argus and the Monitor. The first ore produced was shipped to Sacramento, California, for treatment. Later ore was shipped to Eureka, Nevada. Beginning in 1881, ore was treated locally at stamp mills in the nearby Nevada district, mainly at the Argus Mill at Comins Lake. The district became idle in 1892, but some work was done during the 1930's.

Silver King Mines, the present operator, began work in the district in 1962 with the object of developing deep ore beneath the old mine workings. Drilling failed to locate deep, high-grade ore, but a significant amount of low-grade near-surface material was outlined which became economically interesting when silver prices began to rise in 1973. Further geologic investigation and drilling succeeded in developing a large tonnage of mineable silver ore which could be treated by conventional cyanide methods, and Silver King began mining and milling operations in 1981. The new operations are centered at or near the original discovery site, and production is mainly from the site of the old Argus group of mines.

Rocks in the Taylor district consist of easterly-dipping Paleozoic limestone, dolomite, and shale which have been intruded by dikes and sills of mid-

mid-Tertiary rhyolite.

The paleozoic sediments have been folded into a northwest-trending asymmetrical anticline which has a vertical west limb and a gently dipping east limb. Two prominent fracture systems are associated with this anticline, one striking north-northwesterly, and the other northeasterly. Some of the north-northwesterly fractures have fault offset, down to the west. Original movement on these structures was pre-ore, but re-activation occurred during Basin and Range tectonic movement (Havenstrite, 1980).

Silver ores in the district occur in the Devonian Guilmette limestone and its transition with the overlying Pilot shale and also in the Mississippian Joana limestone.

~~The~~ silver-lead orebodies mined during the pre-1900 period of activity are described as being localized in silicified limestone, along bedding in a breccia zone in the Guilmette limestone. The orebodies were stopped for distances of up to 200 feet along both strike and dip, and were from five to thirty feet thick. Ore consisted of silver chloride, cerussite, and a little malachite, chrysocolla, antimony oxides, galena, sphalerite, tetrahedrite, and gold in a quartz-calcite gangue.

The ore presently being mined by Silver King is essentially the same as the earlier mined material, representing a lower-grade envelope around the older high-grade occurrences. This orebody is described (Havenstrite, 1980) as consisting of argentite and perhaps cerargyrite, in jasperized Guilmette limestone. The silica and silver appear to be contemporaneous, and are slightly older than

the mid-Tertiary intrusive rhyolite. The mineralizing solutions entered along fracture systems and deposited minerals in crackle breccia in and near the axis of the anticline, at or near the Guilmette-Pilot contact. Calcite deposition followed ore deposition. Some supergene redistribution has occurred, giving the deposit a uniform, blanket-like form. Silver King's ore zone occupies about 70 acres and averages 50 feet in thickness. The deposit crops out in many places and coverage overburden thickness is only 30 feet. Havenstrite (1980) gave the deposit size as 7 million tons, averaging 3 ounces silver per ton, with an equal tonnage of lower grade material surrounding the mineable resources.

At the time of our visit (1981), Silver King was mining from two pits, the Argus and the Bishop (northwest of the Argus). The Argus is in the transition zone near the east limb of the major anticline and is overlain to the east by Pilot shale. The Bishop pit explores a jasperoid zone north of the Argus pit, and is near the nose of the north-plunging anticline. The jasperoid occurs along a north-south striking shear zone.

Rhyolite dikes are exposed in both the Argus and the Bishop pits. One, north of the Bishop pit, contains quartz, biotite, and feldspar phenocrysts in a glassy groundmass. The feldspars are completely kaolinized.

In the Argus pit, a pyrite-bearing rhyolite dike was sampled (Sample 907). The dike contained chlorite, and was kaolinized and sericitized. Small pods of fluorite had recently been discovered in the deeper levels of the Argus pit.

No other activity was noted in the district at the time of our visit. The property immediately south of the Argus pit (Taylor mine, underground) is leased

by Einar Erickson's group, but no mining was in progress. The small antimony properties to the south of Taylor were inactive.

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TELEGRAPH DISTRICT

The Telegraph district is located in the northern Egan Range about ten miles south of Cherry Creek. Although the district covers the entire width of the range, most of the old mining activity was concentrated near the head of Telegraph Canyon, a major north-directed drainage located in the center of the district.

The geology of this part of the Egan Range consists of a complexly faulted sequence of Precambrian through Permian sedimentary rocks. In a few places the sediments are capped by Tertiary volcanic rocks. Even though the district is wedged between the Steptoe and Cherry Creek plutons, very few intrusive rocks are shown to outcrop in the area (Fritz, 1968).

Early mining in the district produced small quantities of tungsten and gold. A few gold prospects at the head of Telegraph were worked in 1883. Contact metamorphic deposits containing scheelite also occur in the canyon and on the east slope of the range. These deposits are in silicated Silurian-Devonian dolomites and limestones and may contain small amounts of gold and silver.

A uranium prospect, the Ruggles Leader claim, is located in section 36, T22N, R62E on the west slope of the Telegraph Canyon drainage. The prospect is developed by a single shaft in altered Tertiary andesite(?). A N20W vertical shear zone is exposed in the walls of the shaft. We observed a few old drill holes and recent staking near the prospect.

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WARD DISTRICT

The Ward mining district is located in the Egan Range about eleven miles south of Ely. The district occupies the entire width of the range, but most of the development is on the northern slope of Ward Gulch on the range's east flank. The historic Ward charcoal ovens, once used to produce fuel for smelting furnaces, are located two miles south of Ward Gulch.

The district was organized in 1872 with the discovery of rich lead-silver veins and replacement pods along fissures and intrusive dikes. Since then, mining and exploration have continued intermittently up to the present time. Currently, exploration work at the main Ward mine is being conducted by the joint owners, Silver King Mines, Inc. and Gulf Minerals.

The mineralization in the east part of the district is localized in east-dipping Paleozoic rocks north of the Ward Gulch fault, a high-angle normal fault which follows the easterly-directed Gulch drainage. Deep drilling has revealed that the Paleozoic section here is intruded at depth (approximately 2,000' below the surface) by a 35 m.y. old quartz monzonite stock. The stock intrudes up to the Guilmette formation, but vertical feeder dikes extend up through the Ely limestone and are exposed at the surface of the main workings.

The outcropping dikes consistently trend northwest and define a belt of mineralization in the adjacent limestones. This belt is characterized by rich lead-silver-zinc-copper vein and replacement (tactite)deposits consisting almost entirely of sulfide minerals. Especially notable is the occurrence of massive

sphalerite and chalcopyrite ores in tactite and marble horizons of Guilmette and Joana limestones directly above the main igneous body. Less intense mineralization occurs in the dikes which are often propylitically altered and contain galena in addition to copper and zinc sulfides. The main porphyry body is relatively unmineralized and shows only minor molybdenum mineralization in its thin endoskarn margin.

Mining of the narrow, high-grade vein deposits is difficult and further complicated by local disturbances from folding and high-angle faulting. At the time of our visit, we were unable to visit or sample the main properties because of ongoing drilling activity.

The west flank of the range directly opposite Ward Gulch contains the Old Quaker mine and several drill roads. At the Quaker mine, some gold and silver mineralization is associated with lens-shaped jasperoid bodies which have replaced Joana limestones along north-northwest faults and bedding planes. The structure of the area is complicated by thrusting and overturned bedding and, so far, no significant mineralization has been discovered. Samples of jasperoid from this area were found to contain only trace amounts of silver.

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WHITE PINE DISTRICT

The White Pine district is located in White Pine County in the northern portion of the White Pine Range. It includes Townships 15 and 16 North, Ranges 57 and 58 East. The main mines, as well as most of the smaller workings, are concentrated in the E/2 of T 16 N, R 57 E and in the W/2 of T 16 N, R 58 E. No attempt will here be made to describe the workings of the district nor the detail geology. Excellent descriptions are given by Humphrey and by Smith. For a detail update on the status or activity of the mines in the district, the reader is referred to individual property evaluations that are included in the White Pine district file. While the district is considered primarily a silver producer, being among the top nine major silver districts in Nevada, it has also produced fair amounts of lead, zinc, and copper, and, small quantities of gold and tungsten.

The White Pine district, that part of the White Pine Range referred to as Pogonip Ridge, Babylon Ridge, and the Mokomoke Mountains, is underlain by sedimentary rocks, predominantly limestone and dolomite totaling about 18,000 feet in thickness. These rocks are folded and domed along north-trending axes and are intruded by two igneous stocks, displaced by five sets of faults, mineralized along some of the faults, and overlain in places by basalt, fanglomerate, and alluvium. Rich silver ore was discovered on Treasure Hill in 1868 and during the following 10 years, 20 to 40 million dollars worth of silver was mined and recovered from deposits there. The ore occurred in a fracture zone at the top of the Nevada limestone near the apex of an anticline on Treasure Hill.

Lead- zinc silver- ores occur in dolomitic rocks west of the silver zone and a small amount of chalcopyrite occurs close to the two intrusives. Tungsten and molybdenum occur in skarn zones around the two intrusives as well as in veins and stockworks within the intrusives.

Workings are dominantly shafts and adits with virtually all production coming from underground workings. There has been recent (within the past five years) surface work in the district which consists of a small open pit in the southwestern portion of the district and surface mining, mainly of old dumps, in the heart of the district, on top of Treasure Hill. Activity in the district at the time of examination was minimal and centered in the Monte Cristo area and the area to the immediate north of Monte Cristo, where Phillips Petroleum and Union Carbide are drilling a deep tungsten-moly target. Phillips has been working on their property for several years, and reportedly has drilled out an estimated 5.5 million tons of material averaging .3% WO_3 and .2% Mo (Forrest, Ely Section AIME, 1982). The ore is in skarn found in the Dunderberg formation and has formed in the contact area between the Monte Cristo and Seligman stocks. In addition to this activity, a few claims had recently been staked and a few properties looked as though they had had some recent drilling done on them. However, there was no current mining activity.

Several samples were collected which show the basic composition of the various mineralized areas. Geochemical results from samples within the White Pine district showed a segregation into two general groups. Samples taken from dumps in the Treasure Hill area, the heart of the old silver district, reported silver with associated lead, zinc, copper. Anomalous antimony and arsenic values were

with associated lead, zinc, copper. Anomalous antimony and arsenic values were reported from some of these samples also. The second area lies to the northwest of Treasure Hill generally north of the Seligman area. Samples from this area showed anomalous tin, some tungsten and molybdenum, and generally high arsenic, lead, and zinc. This area may be reflecting geochemical values related to its mineralized skarns associated with the Monte Cristo-Seligman stocks.

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